DEPARTMENT OF THE INTERIOR

UNITED STATES GEOLOGICAL SURVEY

HOLE NO: CE 82-1

LOCATION: SW 1/4 SW 1/4 Section 24, T. 13 N., R. 13 W.,
Tyonek A-5 Quadrangle, Alaska

COLLAR ELEVATION: 380 m

OPEN-FILE REPORT
86-382
PLATE 4

LITHOLOGIC DESCRIPTION

Colluvium, peat, volcanic ash, and diamicton, basal organics at approximately 1.05 m, ash layers from 1.05 - 1.2 m, diamicton (glacial till) from 1.2 - 1.4 m

Diamicton, light-olive-gray, very fine pebbly glacial till, firm

Sandstone, moderate-yellowish-brown, medium-grained, soft, oxidized

Sandstone, dark-yellowish-brown to moderate-brown, medium- to coarse-grained, poorly sorted, base firm and oxidized, upper interval soft

Sandstone, moderate-brown to medium-light-gray, very fine- to medium-grained, poorly sorted, hardness variable with interbedded soft and firm zones, oxidized

Sandstone, olive-brown to medium-light-gray, fine-grained, scattered limonitic specs, hardness variable with interbedded soft and firm zones

Sandstone, olive-brown, massive, top and bottom 0.1 m medium- to coarse-grained central interval fine- to medium-grained, coarser-grained intervals soft, finer-grained intervals firm

Sandstone, grayish-olive-green to moderate-olive-brown, massive, medium-grained grading to fine-grained, well-sorted, high quartz content, firm

Sandstone, dark-yellowish-brown, massive-medium-grained, moderatly well-sorted subrounded, high quartz content, very soft to soft

Sandstone, dark-yellowish-brown, fine- to medium-grained, fine-grained interbeds primarily subrounded quartz grains, finer-grained beds soft to firm, coarser-grained beds very soft

Siltstone, medium-gray, massive, sandy, micaceous, firm

Siltstone, medium-dark-gray to medium-gray, very finely to finely laminated clayey with occasional coal stringers, carbonate "blebs" scattered throughout the lower two-thirds of the unit, firm, grades into unit below

Claystone, olive-gray, massive, few scattered coal inclusions, very firm, grades into unit below

Claystone, brownish-gray, very carbonaceous, finely laminated, thin claystone interbeds, fissile

Coal, black

Sandstone, grayish-black, fine-grained with clay and silt, soft

Coal, black- to brownish-black, moderate-yellowish-brown volcanic ash(?) parting from 30.95 - 31.02 m, core highly fractured and broken into subangular pieces, hard

Coal, black- to brownish-black- to grayish-black, core highly fractured and broken to 35.2 m, from 35.3 - 36.8 m finely laminated, hard

Siltstone, dusky-yellowish-brown to medium-gray, finely laminated, clayey and carbonaceous with decreasing carbonaceous content downwards, firm

Siltstone, medium-gray, thin interbeds of fine-grained sand and clayey siltstone, firm, gradational contact with unit below

Sandstone, olive-gray to medium-gray, fine- to medium-grained with carbonaceous laminae, 0.6 cm diameter quartz pebble at 40.2 m, firm

Siltstone, olive-gray, fine-grained sandstone at top, hard

Sandstone, medium-dark-gray to medium-gray, massive, very fine-grained, silty with interbeds of coaly fragments from 42.3 - 42.9 m and 43.7 - 44.1 m, very firm, gradational contact with unit below

Siltstone, medium-dark-gray, very finely laminated, clayey, very firm

Sandstone, medium-light-gray, fine-grained, irregular fragments of bedded siltstone surrounded by sandstone, soft

Sandstone, medium-light-gray, massive, fine-grained with coal fragments scattered throughout, soft

Siltstone, medium-dark-gray, very finely laminated, very fine-grained sandstone interbeds, small pebbles at base, hard

Sandstone, medium-gray, massive, medium-grained, well-sorted, soft
Interbeds of siltstone, pebbly gravel, clayey siltstone, and medium-grained sandstone

Sandstone, medium-light-gray, massive, fine- to medium-grained

Conglomerate, medium-dark-gray to medium-gray, sandy, very fine-grained, subangular to subrounded grains and pebbles, soft

Interbeded conglomerate and coarse-grained sandstone, medium-dark-gray, soft siltstone, medium-dark-gray, finely laminated, grades into carbonaceous siltstone, 0.1 m coal lens from 56.9 - 57.0 m

Claystone, medium-gray, finely laminated, silty with coal fragments and carbonate "blebs" scattered throughout, very firm, grades into clayey siltstone at base

Siltstone, medium-light-gray, massive, carbonate "blebs" throughout, firm, gradational contact with unit below

Claystone, medium-gray to medium-dark-gray, finely laminated at base, coaly, very firm, grades into carbonaceous claystone, at base

Claystone, olive-black, massive, silty, very hard, basal 0.15 m siltstone, brownish-black, sandy with carbonaceous stringers, very hard

Siltstone, medium-gray to medium-light-gray, massive, grading into clayey siltstone, laminae of wood fragments at 65.6 m, very firm, gradational contact with unit below

Siltstone, medium-dark-gray to medium-gray, massive, sandy grading into clayey siltstone, laminae of wood fragments at 66.3 m, carbonate "blebs" scattered throughout sandy material, carbonaceous stringers in clayey interval, hard

Siltstone, medium-gray, massive, clayey, very firm

Siltstone, medium-gray- to medium-dark-gray, finely laminated, sandy, very fine-grained with interbeds of clayey siltstone and coal lenses

Siltstone, medium-dark-gray, finely laminated, carbonate "blebs" scattered throughout, firm- to- medium hard, slickensides at 75.9 m, gradational contact with unit below

Siltstone, medium-dark-gray, massive, clayey with carbonate "blebs" scattered throughout, very firm

Claystone, medium-dark-gray to brownish-black, very finely laminated, carbonaceous, hard, slickensides from 77.5 - 77.7 m, clayey siltstone from 79.0 - 79.3 m, medium-gray, very hard

Siltstone, brownish-gray to medium-gray, finely laminated with regular wavy bedding and frequent minor faulting, clayey grading to very fine-grained sandy siltstone by 84.4 m with numerous interbeds of claystone, siltstone, and very fine-grained sandstone, micaceous, some carbonate "blebs", very firm

Siltstone, brownish-gray to medium-gray, finely laminated with flow structures in the bedding, very firm

Siltstone, medium-gray to brownish-gray, finely laminated, interbeded with claystone and coaly horizons, micaceous, fossil-leaf impression at 85.2 m, firm

Siltstone, brownish-gray to olive-gray, very finely laminated, clayey, carbonaceous laminae, numerous zones of carbonate "blebs" scattered throughout, very firm, possible slickensides at 87.8 m, gradational contact with unit below, minor fault planes from 89.5 - 89.7 m

Claystone, dark-grayish-brown to medium-dark-gray, very finely laminated, carbonaceous to slightly silty, cyclic bedding of lighter and darker silty claystone and claystone from 93.9 - 96.3 m, very hard, slickensides at 93.8 m, gradational contact with unit below

Claystone, brownish-black to brownish-gray, very finely laminated, carbonaceous with many thin coal lenses, increasingly carbonaceous downward, very firm

Coal, black- to- dusky-yellow-brown, very finely laminated, probably lignite

Claystone, brownish-black to dusky-yellow-brown, very finely laminated, carbonaceous with many thin interbeds of coal, firm

Coal, brownish-black- to- black, massive to very finely laminated, carbonaceous claystone from 109.1 - 109.3 m, tuff(?) lens at 109.5 m, hard, high-angle fractures throughout upper two-thirds of coal interval, no recovery zone from 110.6 - 110.7 m

Sandstone, medium-gray to medium-light-gray, massive, fine- to medium-grained, primarily subangular quartz and black phaneritic grains, coal lenses in upper half, hard in coaly zone, soft to very soft below

Siltstone, medium-gray to medium-light-gray, massive, clayey with occasional coal laminae at various angles to the horizontal, firm, carbonate-cemented siltstone from 112.55 - 112.85 m, medium-brownish-gray, very hard

Sandstone, medium-gray, finely laminated, very fine- to medium-grained, slightly silty, micaceous, soft and friable

T.D. 114.6

DEPTH (meters)

LITHOLOGY

GRAIN SIZE DISTRIBUTION 1/
sand
silt
clay
% of dry weight
10 30 50 70 90

ATTERBERG LIMITS 2/
plastic — liquid
• Natural moisture
x Organic content
(%) Percent
10 30 50 70 90

3/
— Natural density
| Dry bulk density
• Grain density
in g/cc
1.3 1.5 1.7 1.9 2.1 2.3 2.5 2.7

SLAKE DURABILITY INDEX 4/
% Remaining
(after 2 cycles)
10 30 50 70 90

POINT-LOAD STRENGTH INDEX 5/
(approximate unconfined compressive strength)
Axial (⊥)
MN/m2
1.0 2.0 3.0 4.0 5.0

Diametral (II)
MN/m2
1.0 2.0 3.0 4.0 5.0

Anisotropy
(⊥)/(II)
1.0 2.0

UNCONFINED COMPRESSIVE STRENGTH 6/
MN/m2
1.0 2.0 3.0 4.0 5.0

ULTRASONIC VELOCITY
Compressional-wave velocity
Shear-wave velocity
meters/second
500 1000 1500 2000

7.2
8.9
17.3
11.2
10.7
11.0
18.2

EXPLANATION

DIAMICTON
SANDSTONE
SILTSTONE
CLAYSTONE
COAL
CLAYSTONE- CARBONACEOUS

Clayey
Silty
Carbonaceous

1/ Tested in accordance with ASTM D 422-63.

2/ Tested in accordance with ASTM D 423 and D 424.

3/ Tested in accordance with ASTM D 854 and Chleborad and others, 1975.

4/ Tested in accordance with method described by Franklin and Chandra, 1972.

5/ Tested in accordance with method described by Brock and Franklin, 1972. Calculated in meganewtons/meters^2 using the formula: $U\text{-}I_{s(50)} \times 24$.

II Diametral test (loaded parallel to bedding planes)

⊥ Axial test (loaded perpendicular to bedding planes)

6/ Tested in accordance with ASTM D 21166-66.

Plate 4.--Lithologic and geotechnical data log for U.S. Geological Survey drill hole CE 82-1.

By

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1986